

Judaism and Science

with Norbert M. Samuelson, "Reflections on the Distinctness of Judaism and the Sciences"; Noah Efron, "Zionism and the Eros of Science and Technology"; and Bradley Shavit Artson, "Co-evolving: Judaism and Biology"

ZIONISM AND THE EROS OF SCIENCE AND TECHNOLOGY

by Noah Efron

Abstract. From the earliest nineteenth-century manifestos through the big, technology-rich development projects of Israel's recent history, science and technology have loomed large in Zionist ideologies. There were several reasons for this. From the start, science and technology fit snugly with many aims, ideals, and ideologies of Zionism. Science and technology offered means to establish Jewish title to the land. They made plain that Jewish settlement of Palestine was a Western project imbued with Western ideals. Science and technology (and scientific industry) made plain the progressive nature of the Zionist undertaking. They informed arguments that Jewish settlement would even benefit those locals displaced by the Zionists, bringing them culture of universal value, and providing a bridge between these "backward" societies and the "advanced" West. More importantly, science and technology helped meet growing practical needs of Jews building a national infrastructure in Palestine. The imprint of these considerations has remained large and influential in Israeli society until today.

Keywords: Israel; science; technology; Zionism

For eight months in 2003, a task force of forensic scientists, paper conservation experts, and paleographers convened daily in a Jerusalem laboratory to make meaning of what was little more than paper pulp. In the end, their success was greater than anyone had expected, and their work earned banner headlines in the daily press.

The task force had, rather miraculously, reconstructed scraps of the final entries of Ilan Ramon's diary. In January of that year, as everyone will remember, Ramon died when the Space Shuttle Columbia disintegrated

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reentering earth's atmosphere. Somehow, eighteen pages of Ramon's diary survived an explosion at 17,000 miles per hour producing 5,000 degree heat, floating to earth in Palestine, Texas. The pages were discovered only many rainy weeks later, and by then Ramon's scrawl was besotted by rain. NASA transferred the blurred scraps to Israel, where the best scientists deciphered them, using a requisitioned Video Spectral Comparator and other high-tech devices. By year's end, Rona Ramon, received a facsimile of her husband's last musings, in his own hand, and local newspapers hastened to publish excerpts. "We were pleased," said James Snyder, the director of the Israel Museum that hosted the taskforce, "that we had the hands-on experience and the technology, which we used on such materials as the Dead Seas Scrolls, to be effective on these pages" (Green 2005).

There was something fitting to the fact that it was thanks to scientists using the latest technology that Ramon's wife and kids, and the rest of us, could enjoy his self-effacing humor and surpassing decency one last time. To Ramon, science and technology were a salve and an inspiration. Three days before he perished, he had displayed a tiny Torah scroll in a live feed from the space shuttle Columbia, saying:

It is a small Torah scroll that 60 years ago a little boy in [the Nazi death camp] Bergen-Belsen received from the rabbi of Amsterdam. The rabbi taught him from it for his bar mitzva. That 13-year-old boy read the weekly portion from this Torah. It was with him since then. That boy, Yehoyahin Yosef, survived the Holocaust, arrived in Israel, fought in the country's wars and then went on to become a distinguished professor of planetary physics. (Keinon 2003)

Ramon explained that the scroll symbolized "more than anything the ability of the Jewish people to survive everything, including horrible periods, and go from the darkest days to days of hope and faith in the future." He was stirred by the contrast between the concentration camps, where Jews were utterly abandoned, and the cheery fellowship he enjoyed in space. From Bergen-Belsen to physics, and from Bergen-Belsen to space, the distance was so vast that it seemed miraculous to Ramon that Jews had traversed it in so little time. "I was talking to a lot of . . . Holocaust survivors," Ramon told a NASA interviewer during his preflight interview. "And when you talk to these people who are pretty old today, and you tell them that you're going to be in space as an Israeli astronaut, they look at you as a dream that they could have never dreamed of. So, it's very exciting for me to be able to fulfill their dream that they wouldn't dare to dream." Ramon was a national hero, and his appeal owed in part to the fact that he managed powerfully to link the particularity of Jewish and Israeli experience, with the universality of science. In an interview before the flight, he told of his mother in Auschwitz and then about his pride, one short generation later, at carrying out experiments that would produce benefits shared by all "humans in the world and the whole scientific community

in the world.” Doing science, as a Jew and as an Israeli, Ramon suggested, was a reply to Auschwitz, a rebuke to Auschwitz, a victory over Auschwitz (NASA 2002).

The image of scientists poised before monitors, day after day, week after week, devising algorithms that calculate back the osmotic spread of ink on seared and waterlogged scraps to preserve Ramon’s last thoughts is hauntingly beautiful and *odd*, just as Ramon hoisting up to the shuttle communications cam his little Torah written by hand and from memory in the barracks of a Nazi death camp was hauntingly beautiful and *odd*. These fragile moments display passion in a place one might not expect to find it. And yet, such passion, such eros, is often there at the meeting point of Israeli identity and of science and technology, and it has been since the earliest days of Zionism.

Israel is not only the most scientifically advanced country in the Middle East (a region admittedly not distinguished by its scientific achievements), it is one of the most scientifically advanced countries in the world. Per capita, Israel has more engineers than anywhere else (135 per 10,000 citizens, compared with 85 in the United States), and many more physicians (450 per 10,000, compared with 23 in the United States). Israeli scientists publish more scientific papers than those of any other nationality (110 papers per year per 10,000 citizens) (Griver 2001). Estimates are that one of every three recent innovations in telephony and communications were devised by Israeli scientists, and that Israel has the world’s third largest concentration of high-tech companies (Golan 2004, v). Science and technology also play an inestimable role in Israel’s armed forces. When then-Prime Minister Ehud Barak advocated maintaining a “small but smart” army, his point was that superiority in science is all that could provide Israel with a sustainable military advantage over its much larger and wealthier neighbor states. Science is at the heart of Israel’s security policies and economy; it is, no less, at the heart of Israel’s self-image. Israel’s first president was Chaim Weizmann, an indefatigable Zionist politician, but also a renowned chemist who was the director of the British admiralty laboratories in the First World War, and who became famous after he developed a synthetic acetone to be used in the manufacture of explosives. When he retired, Albert Einstein was asked to serve (he declined) (Frazier 1975, 28). Israel’s fourth president, Ephraim Katzir, founded and ran the biophysics laboratory at the Weizmann Institute, and earned his reputation as a scientist developing polyamino acids as models of natural proteins (Katchalski-Katzir 1991). It seemed, for a time, that the road to the presidential residence in Jerusalem ran through the laboratory. It was a notion Israelis were proud of. Years ago, the Israeli government commissioned a poster to encourage Jews from abroad to move to the Holy Land. It shows a shattered shard of ancient pottery, partially reassembled by archeologists, around a Pyrex Florence flask with a stopcock and bent

pipet, filled with an electric blue liquid. The caption reads, “Your Future Is Where Your Past Is.” The poster left no doubt: this future is science.

SCIENCE AND EARLY ZIONIST THOUGHT

The notion that Israel’s fate is tied up with science is far older than the state itself. Theodor Herzl wrote in his 1896 manifesto *Der Judenstaat* (*The Jewish State*) that “the founding of a Jewish State presupposes the application of scientific methods. We cannot journey out of Egypt today in the primitive fashion of ancient times.” Among the goals of the state, Herzl wrote, will be to “participate in all honorable activities, work towards progress in art and science, so that the glory of our deeds is imparted to the poorest members of our people. This is how I understand Judaism” (Herzl [1896] 2007, 39). In his utopian novel *Altneuland* (*Old-New Land*), Herzl gave substance to these abstractions, describing a society more mechanized and technologically advanced than any the Jews left behind in Europe. European visitors, returning to a Palestine that not long before was hopelessly primitive, are amazed at the improvements engineered by Jewish immigrants to the region:

they had to halt at a railway crossing because a train was due. It appeared presently, rushing southward at great speed. When the visitors remarked that the locomotive had no smokestack, they were told that this line, like most of the Palestinian railways, was operated by electric power. There was one of the great advantages of having begun from the beginning. Just because everything here had been in a primitive, neglected state, it had been possible to install the most up-to-date technical appliances at once. So it had been with the city planning, as they already knew; and so it had been with the construction of railways, the digging of canals, the establishment of agriculture and industry in the land. The Jewish settlers who streamed into the country had brought with them the experience of the whole civilized world. The trained men graduated from universities, technical, agricultural and commercial colleges had brought with them every type of skill required for building up the country. The penniless young intelligentsia, for whom there were no opportunities in the anti-Semitic countries and who there sank to the level of a hopeless, revolutionary-minded proletariat, these desperate, educated young men had become a great blessing for Palestine, for they had brought the latest methods of applied science into the country. (Herzl and Levensohn 1941, bIII)

And Herzl was not alone in linking the growth of a Jewish state with the advance of science (though, as we’ll see his attitude was not shared by all early Zionists). Speaking before an “emergency Palestine economic conference” in Washington, DC in November 1929, U.S. Supreme Court Justice and Zionist leader Louis Brandeis observed that “the Jewish pioneers demonstrated that it was still possible to make Palestine into a land flowing with milk and honey and with much besides. Touched by intelligent effort supplemented by science, it began to bloom almost as a miracle” (Brandeis

[1929] 2009). Earlier, Brandeis had said that it was American Jewish doctors and scientists who made possible the notion of a Jewish state, when they “undertook to make health possible in Palestine. And it really was not a difficult problem, for the lack of health was largely due to malaria. Happily, science enables us to grapple with this disease which had devastated many countries of the world for thousands of years. We know how to rid a land of it” (Brandeis [1923] 2009). As a matter of principle and practice, Jews would capture the Land of Israel through science and technology.

Principle met practice at research centers that were among the first important institutions Jews established in Palestine. In 1911, Aaron Aaronsohn established with American financial support the “Jewish Agricultural Experiment Station” in Atlit. Aaronsohn, who had achieved international fame four years earlier with, as *Science* reported it, “his discovery of the long-sought wild prototype of wheat,” raised cash from American Jewish philanthropists and politicians, many of whom, such as Julius Rosenwald, Samuel Fels, and Jacob Schiff, also supported and promoted American science and medicine, explaining that his labs would draw experts from around the world and “go far towards introducing American methods in the study of agricultural problems throughout the whole Mediterranean region” (Fairchild 1910). Soon other agricultural research centers were established as well, with aim of enabling Jewish pioneers to bring Western science to the Levant.

Others, of a more bookish bent, sought to establish universities with the same aim. The idea of a Jewish university in Palestine was first proposed in 1882 by a German mathematics professor (and ordained Rabbi) named Zvi Herman Shapira. Shapira wrote in the Hebrew paper *Ha-Melitz*:

We must take care from the very beginning of the establishment of settlements in the land of our forefathers, to establish in the center of these settlements a great house of learning, from which wisdom will emanate, wisdom and morality for all the house of Israel. This house shall be divided in my opinion into departments (1) theology, (2) theoretical sciences, and (3) practical sciences. . . . The theoretical department will teach natural sciences, geometry, mechanics, astronomy, etc. (about which it was written, “this is your wisdom and understanding in the sight of the peoples” [Deut 4:6]). And the practical department will teach chemistry, botany, geology, architecture and agriculture. . . . (Dudai 1970, 7)

The first Zionist Congress, meeting in Basel, Switzerland in 1897, discussed Shapira’s idea approvingly, and at the fifth Congress, meeting in Basel in 1901, first steps were taken to make it a reality. Following the meetings, Chaim Weizmann, Martin Buber, and Berthold Feiwel published an influential pamphlet called “A Jewish Higher School,” advocating the establishment of:

a place for Jewish youth prevented from learning a profession in the lands of their birth, and for whom the gates of science are closing in their faces. . . . Important

Jewish scholars, who are deprived because of their backgrounds, . . . they would find in it a place in which they could devote themselves entirely to science, and also entirely to their people . . . This undertaking, were it to exist, would serve our nation as a proud proof of its living and creating power, and this proof would provide the strength and confidence in still greater national achievement. (Dudai 1970, 8)

At about the same time, Herzl proposed to Abdul-Hamid II, Sultan of the Ottoman Empire, the establishment of a Jewish university in Jerusalem that would serve subjects of the empire of all backgrounds and religions. The Sultan dismissed the idea as impractical. Still, a fund-raising apparatus was devised by the Zionist organization and set into motion, and over the first two decades of the twentieth century, and especially beginning in 1914, land and buildings on Mt. Scopus were purchased as the site of a future university. In 1918, after the First World War had dismantled the Empire and established the British as the administrators of Palestine, Chaim Weizmann laid the cornerstone of the Hebrew University in Jerusalem, declaring that the university will strive to bring blessings not just to Jews but to all nations. In 1921, Weizmann and Einstein barnstormed the United States, raising money for the new university (Anon 1921; Missner 1985). (“They don’t need me for my abilities but because of my name,” Einstein wrote to the Jewish chemist Fritz Haber, “whose luster they hope will attract quite a bit of success with the rich kinsmen of Dollar-land” [quoted in Rowe & Schulmann 2007, 148].) Building proceeded and the official opening of the university took place in an amphitheater on Mt. Scopus, on April 1, 1925.

It was a festive affair attended, as the *Festschrift* reports, by “some six or seven thousand persons including many visitors who traveled thousands of miles to be present at the ceremony” (Hebrew University 1925, 5). There were many speeches, some blandly congratulatory, some expansively poetical. Sir Herbert Samuel, the British High Commissioner in Palestine, predicted that “in this House of Wisdom, there will be studied and taught the most ancient literature and the most modern science, side by side” (Hebrew University 1925, 27). Weizmann was the one most people came to hear:

What we are inaugurating to-day is a Hebrew University. Hebrew will be the language of its schools and Colleges. But a University is nothing if it is not universal. It must stand not only for the pursuit of every form of knowledge which the mind of man embraces, but also for a commonwealth of learning freely open to all men and women of every creed and race. Within the precincts of these Schools political strife and division cease and all creeds and races will, I hope, be united in the great common task of searching for truth, in restoring to Palestine the thriving civilization which it once enjoyed, and in giving it a place of its own in the world of thought and learning. Our University would not be true to itself or to Jewish traditions, if it were not a house of study for all peoples and more especially for all the peoples of Palestine. Conceived in this spirit, and animated by

these ideals, the University has before it, if our hopes are realized, a future pregnant with possibilities, not only for the Jews of Palestine, but also for the awakening East and for mankind at large. (Hebrew University 1925, 24–25)

Weizmann declared that the new university will:

win its spurs and build up its reputation by the distinctive value of its contributions to the common stock of knowledge. We have begun with a group of institutes for advanced research in those branches of science and learning for which Palestine offers particularly congenial soil. . . . Three such institutes [will be] devoted respectively to chemistry, to microbiology, and to Jewish and Oriental studies, and before these celebrations are concluded, we shall lay the foundation stone of an Institute of Physics and Mathematics to be associated with the name of Einstein. (Hebrew University 1925, 23)

The Hebrew University was not alone. In 1912, the cornerstone had been laid in Haifa for the Haifa Technical Institute, or *Technicum*. It was not until 1924 that the Institute was opened, as fundraising difficulties and the war slowed its construction. In its first year, 20 students enrolled to study civil engineering and architecture. Divisions of mechanical and electrical engineering were soon added, and the student body grew rapidly. In 1934, the Daniel Sieff Research Institute was founded in Rehovot, quickly establishing itself as a center for chemistry research. It was here that Chaim Weizmann established his laboratory. Beginning in 1944, to mark Weizmann's seventieth birthday, the Sieff Institute was gradually expanded and renamed the Weizmann Institute of Science (which was formally incorporated finally in 1949) (Keynan 1988, 10–11). By the mid-1950s, when new universities were hastily being planned for Ramat Gan, Tel Aviv, Haifa, and Beer Sheva, about 6,300 students were studying in institutions of higher learning in Israel, and of these about 4,000, or 63 percent, were studying natural sciences, medicine, agricultural sciences, and engineering.¹

Universities, research centers, and experimental stations were the sites of formal science in the Jewish settlement in Palestine and their importance only grew with time. But, most Yishuv Jews came to experience science from well outside the laboratory and the university classroom. Farmers on socialist *kibbutzim* and cooperative *moshavim* were visited regularly by agricultural advisors who brought with them new agricultural techniques and, often, newly developed seeds for crops and feeds for livestock. Increases in farm production were publicized and celebrated in Palestine with enthusiasm, symbols of the power of Jewish sweat and science. In farms, towns and cities, scientific medicine, and public health assumed a more intimate place in people's lives. Schools taught scientific diet and hygiene, in an effort to bring to Western standards children raised by "primitive" parents. "We are spreading culture," was how one nurse explained their mission to a group of young "health scouts" in 1931 (Shvarts and Davidovitch 2004). Geographers and cartographers set out to

map and document Palestine, replacing Arabic names with Hebrew names as they did and, what's most extraordinary, some of these men became national heroes (Benvenisti 1986).

The introduction to a children's book *The Pioneers: The Nature Researchers of the Land of Israel*, captures this well in its epigraph:

A hundred years ago, our land was unknown. The flowers and the trees that bloomed in its fields and hills, the birds that swooped from branch to branch, the wild animals that wandered on its paths were a sort of mystery. In 1863, a British research expedition arrived in the land of Israel. . . . [Then] came Jewish researchers—Aaron Aaronsohn who discovered the prototype of wheat, Ephraim ha-Reuveni the researcher of the country's plants, and Israel Aharoni the zoologist and many others as well. (Smoly 1972, frontispiece)

These "Jewish researchers" became celebrities in their own right. Israel Aharoni (1882–1946), for example, was engaged in 1908 by the Sultan Abdul-Hamid II to perform zoological surveys of Palestine. Aharoni devoted the next 38 years to cataloging the fauna of the holy land, collecting species, anointing them like Adam with Hebrew names, publishing scientific notices, writing Hebrew field guides to Palestine, and tramping into the wild with generations of schoolchildren. When he published his *Memoirs of a Hebrew Zoologist* in 1943, it quickly went through printing after printing (Aharoni 1943).

The appeal of figures like Aharoni was complicated and contradictory. The Jewish botanists, zoologists, geographers, and geologists who fanned out over Palestine in the first decades of Jewish settlement were at least two things at once. They were outdoorsmen, men of action, sunswept, and ruddy of complexion, with dirty hands and torn workclothes. In this, they embodied the pioneering ideal, with its echoes of German romantic rejection of sallow intellectualism. But at the same time, they were men of science, bringing to Palestine for the first time the system, the promise, and the progress so easily associated at this time with Western science. And through science, they seemed to offer a justified, if not necessarily just, means to possess the land. "A hundred years ago, our land was unknown," the children's book begins. But through the efforts of Jewish scientists, a generation of Jews in Palestine came to believe, it was now discovered.

At the same time, there were others who resisted the efforts to build a scientific technocracy in Palestine, or at least registered ambivalence. Aharon David Gordon, a charismatic Russian who moved to Palestine at forty-seven in 1904 and began to work fields near the Sea of Galilee, criticized the science and technology that make agriculture easier as yet another way deployed by overly clever Jews to circumvent work. In a few cases, idealists in early *kevutzot* and *kibbutzim* argued deep into the night about whether it was moral to purchase a power thresher or binder. The tensions between romantic and the more technocratic approaches toward developing a Jewish presence in Palestine would remain until after the state

was established. But, it was not long before even the most romantic of Zionist settlers came to embrace technology and the science that stood behind it, at first with ambivalence and then with enthusiasm. At the end of the late-night meetings, the answer was almost inevitably the same; yes to the thresher. Yes to synthesized fertilizer, insecticide, and herbicide. Yes to scientifically bred grain and fruit and vegetables. It was not long before, even on the most militantly ideological kibbutzim, to the romance of back-to-the-earth pioneering was grafted the romance of laboratory-bred *yiddisher-kupf*-itude that allowed pioneers (or *chalutzim*, as they were known) to wrench from arid Palestine better yields than had been witnessed since Joshua and the spies observed that this was a land of milk and honey.

SCIENCE AND ZIONIST IDEOLOGY

Now, it was no coincidence that the pioneer-scientist was a hero to kids caught up in the drama of building a Jewish homeland; the fact was that science and technology fit snugly with many of the aims, ideals, and ideology of Zionism.

Science and technology helped establish Jewish title to the land, sometimes explicitly (as by archeologists who documented generation after generation of Jewish hold on the land, reaching in an unbroken chain back to Joshua in Jericho), and sometimes through a more complicated chain of reasoning. Science and technology made plain the notion that Jewish settlement of Palestine was, in the end, a Western project flush with Western ideals and committed to advancing those ideals in the East. In planning the “Jewish Palestine” pavilion for the 1939 New York World’s Fair, wrote one of the organizers, the plan was “to stress . . . the transformation of the country by modern intelligence, thus use of the best modern technical resources, courage, self-reliance, faith and hard work.” The pavilion hosted six galleries, most of which stressed the technological savvy of the settlers: the Hall of Agriculture and Resettlement, Hall of Town Planning and Communications, Hall of Industry, Hall of Culture and Education, Hall of Health, and the Hall of Labor and New Social Forms. A huge mosquito greeted visitors to the Hall of Health, symbolizing the success of Jewish doctors in eradicating malaria. The handbook to the pavilion encouraged guests to view a large statue standing at the foreground of the Hall of Industry:

This statue . . . is of Lot’s wife. You remember that she and her husband ran away from Sodom and Gomorrah, which God destroyed and covered with the waters of the Dead Sea. She was told not to look back – but she did, and was changed to a pillar of salt. Today, she symbolizes our determination not to look backwards. (Gelvin 2000, 51–52)

Science and technology (and scientific industry) made plain the *progressive* nature of the Zionist undertaking; embracing, as Weizmann

put it, “the pursuit of every form of knowledge which the mind of man embraces” and seeking “a commonwealth of learning freely open to all men and women of every creed and race.” (The great Gottingen mathematician, Edmund Landau, laying the cornerstone of the Einstein Institute, emphasized that “pure science knows no borders between nations, and who will give that this view will penetrate the hearts of those yet far from it?” [Hebrew University 1925, 108].) In this way, science and technology were at the heart of arguments that Jewish settlement of the Holy Land would even benefit those primitive locals who might be displaced by the Zionists, by bringing them culture of universal value, and by providing a bridge between these backward societies and the advanced West. This was an old notion that found expression in the earliest Zionist writings, as when Moses Hess quoted Ernest Laharanne at length in his own proto-Zionist masterpiece, *Rome and Jerusalem*:

A great calling is reserved for the Jews: to be a living channel of communication between three continents. You shall be the bearers of civilization to peoples who are still inexperienced and their teachers in the European sciences, to which your race has contributed to much. (Hertzberg 1997, 134)

Bringing European sciences to local inhabitants was assumed to be a benefit that more than justified the hardships that accompanied the arrival of the Zionists. The impact of the wise use of science and technology provided further justification. Zionists pointed to increased agricultural production—what they often called “making the desert bloom”—as a sign of the righteousness of their endeavor. This attitude, which blended a sort of Calvinist belief that success is a sign of divine election with a sort of Lockean belief that improving through labor confers ownership, was rarely analyzed critically, but had retained some of its persuasive force, at least in Israel, until this day. It was an attitude that was vigorously colonialist, stitching seamlessly a sense of sure intellectual superiority, inerrant entitlement, and selfless virtue. Through superior Western science and technology, Jews would win Palestine, and from this no one would benefit more than the indigenous Palestinians. It is no wonder that this formula had such urgent appeal.

Science also served to link the promise of Zionism with the achievements of generations of Jewish scientists abroad and their famed *Yiddisher Kupf*, or Jewish genius (Gilman 1996). It was no coincidence, nor was it idle generosity, that led the Hebrew University to name its Institute for Physics and Mathematics after Einstein (just as it had been no coincidence, as Einstein himself observed, that he was pressed into service schnorring for Zionism in “Dollar-land”). One of the great appeals of having an Institute for Physics and Mathematics in the first place, for some Zionists in any case, was the link it suggested between what was being done in the dusty alleys of Jerusalem, and what Einstein had achieved in Bern

twenty-odd years earlier. Zionist leaders such as Chaim Weizmann, when they stumped support, kept close tally of the German and American and Russian Jews accumulating Nobel prizes, promising that these numbers—miraculous though they were—would be dwarfed by the achievements of Jewish scientists working under the flag of a Jewish state.

And just as science served to associate Zionists with the achievements of refined and educated Jews in Europe, it served as well to dissociate Zionists from other, more religious, Jews they had left behind. This was of great importance to some Zionist theorists. Samuel Joseph Ish-Horowitz wrote that “the Jew must negate his Judaism before he can be redeemed” (Efron 1991, 89). Judaism, seen as traditional observance, was seen as standing in the way of human redemption. Marcus Ehrenpreis was less charitable still to traditional Judaism:

We have liberated ourselves from the shackles of a sickly, rotten, and dying tradition! A tradition that cannot live and does not want to die; a tradition that manacled our hands, blinded our eyes, and confounded our hearts, that darkened our heavens and banished light and beauty and tenderness and pleasantness from our lives, that turned our youth into old men and our elders into shadows. We have liberated ourselves from the excessive spirituality of the Exile. . . . We have liberated ourselves from the rabbinic culture, which confined us in a cage of laws and restrictions. (Efron 1991, 89)

Such displays of rationalist scorn were commonplace in Zionist circles. A leitmotif of much Zionist prose is a yearning for *normalcy*, for a culture in which Jews were not merely, or even particularly, Jews, but rather human beings. As the speeches at the founding of the Hebrew University made clear, nothing was viewed as more human, more universal, than the pursuit of science.

By embracing science, then, some Zionists deliberately associated the Zionist project with the progressive West and with the great achievements of generations of Jewish scientists abroad, while dissociating it from the primitive, overly *Jewish* Jews of the Shtetl. Along the way, it provided ample justification for colonization of what most Zionists saw as hopelessly primitive Palestine. Jews would bring the best of the West to the Levant—wealth, culture, comfort—and they would do it using those tools that Jewish hands had handled so capably in the West: the tools of modern, universal science. In these ways, science served perfectly the *ideological* agenda of political Zionism in the decades before Israel was established.

SCIENCE, TECHNOLOGY, AND THE PRACTICAL NEEDS OF THE EMERGING STATE

But, this was not all there was to it. Science (and technology) increasingly met growing practical needs of Jews building a national infrastructure

in Palestine. When Lord Peel, the chairman of the Palestine Royal Commission dispatched from England in 1936 to consider limiting further Jewish immigration to Palestine, found Weizmann tending test tubes in his Rehovot laboratory and inquired what the scientist was doing, Weizmann replied, "I am creating absorptive capacity" (Calder 1959, 6). Behind this joke was Weizmann's dead serious belief that only through science would it be possible to feed, clothe, heal, and protect Jews in Palestine as their numbers grew. For Weizmann, and there were many others like him, the ideological appeal of science and its practical appeal were inseparable. The degree to which this was so became obvious in the decade immediately before, and the decade immediately after, the establishment of Israel in 1948.

The first two decades of the country's existence established Israel as a technocracy willing to devote great resources to developing science and technology, and persuaded that its economic, political, and social success depended on science and technology. It was during this time that the Israel Defense Forces formulated its basic strategy of maintaining technological and scientific superiority at all costs, and established the laboratories, R&D facilities, and factories necessary to implement this strategy. Ben Gurion had outlined this strategy in a 1947 memo he sent to the head of the *haganah*, setting forth a strategy for winning by force and maintaining a state.

Our human materiel in general is . . . immeasurably better in its moral and intellectual ability than our neighbors. This is our main advantage and at the moment almost our only advantage. . . . We must . . . [take] advantage of all the achievements of state-of-the-art science and technology for our defensive needs. (Katzir 1989, 28)

Ten years later, much in the spirit of Ben Gurion's memo, and with his enthusiastic support, Israeli physicists had constructed an atomic bomb.

It was during these decades that the first huge technological development projects were dreamed up and carried out, and it was during these years that the allure of such huge projects grew so great that no one thought to question them. The Hula Swamp was drained with a passion and brio so heartfelt that, from today's remove, at which this massive feat of engineering is generally seen as an ecological tragedy, one's heart breaks to conjure the spiritual devotion with which the project was carried out (Maoz 2010). Plans for desalinization plants, for satellites, for alternative energy, were hatched with similar enthusiasm (Tall 1959, 250–251).

It was during this time that science and technology transfer became Israel's diplomatic stock-in-trade, especially in the Third World. In 1953, Foreign Minister Moshe Sharett agreed to send agricultural and aeronautics experts to Burma, a relationship that blossomed into diplomatic relations and, in 1955, a state visit by Burmese Prime Minister U Nu, the first such

visit by an Asian leader. After she assumed the post of Foreign Minister, which she held from 1956 to 1966, Golda Meir established scores of technical, scientific, medical, and agricultural assistance programs in Africa, a good number of which paved the way to full-scale diplomatic relations (Meir 1975, 263–90; Nadelmann 1981, 184–88). What characterized these diplomatic efforts, one scholar later concluded, was their “almost total focus on technical assistance” (Laufer 1972, 619). Science and technology broke barriers where politics and traditional diplomacy could not (Ajami and Sours 1970; Brecher 1961; Reich 1964).

CONCLUSION: ENCHANTMENTS OF SCIENCE AND TECHNOLOGY

For all these reasons, it was also during this time that, as the U.S. Embassy analyst put it, Israelis became “indissolubly tied to science and technology as a principal motivating factor in social and economic progress” (Zahlan 1972, 3). Almost from the moment the first Zionist settlers found their ways to Palestine late in the nineteenth century, science and technology had been revered for many reasons, as we have seen. Jews in Europe and America had enjoyed prodigious success at science, and with this success came status that all Jews, including Zionists, wished to appropriate. Scientific achievement was also synonymous with progress and enlightenment and rationality, traits that many Zionists, who were weary of being viewed in Europe as primitives, greatly admired. And just as the great colonial powers—England and France first among them—used science and technology as a way to justify their occupation of far-flung lands, arguing that they were bringing progress and modernity to their backwards wards, so too they gave Zionists the cheery confidence that they were saving the Levant, bringing it into the twentieth century, rather than appropriating it. In all these ways, science and technology played a role from the very start in the way many Zionists understood who they were and what they were doing.

And they still do. In June 2004, Gunnar Öquist, the Secretary General of the Royal Swedish Academy of Sciences, announced that two Israeli scientists, Aaron Ciechanover and Avram Hershko, had won a Nobel Prize in Chemistry, together with their American collaborator Irwin Rose. The three men had discovered how cells break down certain proteins, an insight that could lead to a cure for cervical cancer and cystic fibrosis. Overnight, Ciechanover and Hershko were national heroes, and their advice was sought on television and radio about everything from politics to fashion. The Internet site of Israel’s largest daily newspaper, *Yediot Aharonot*, received hundreds of comments about their article reporting the prize. “The Jewish mind always was and always will be the smartest mind in the world,” read one from Hadera, “You are our pride and by virtue of people like you we will survive.” “Israel is a light unto the nations,” read another from Haifa. “Invest in science, and not in Jewish religious schools and

ritual baths.” “The Arabs are eating their hearts out; they will never reach the achievements of the Israelis and Jews.” When Ada Yonat won the prize, also in chemistry, in 2009, reactions were nearly identical (Ilani 2009).

Science and technology are today a powerful part of self-image of a great many Israelis, and a source of considerable comfort. Science and technology allow Israelis to sleep at night. Science and technology allow Israelis to feel superior to their hostile neighbors who may just “eat their hearts out.” Science and technology promise a wealthier future and a healthier future. Science and technology also seem to link Israel with the world—as a universal endeavor—but also with its particular Jewish heritage, as a token of Israel’s perpetuation of Jewish scientific genius.

And in the minds of many Israelis, it is science and technology that brought Jews so miraculously from concentration camp to Cape Canaveral, that gave us Ilan Ramon, and gave us the means properly to honor his tragic loss.

In Israel’s national amphitheater in Rehovot, one finds the following quotation carved onto stone tablets:

I feel sure that science will bring to this land both peace and a renewal of its youth, creating here, the springs of a new material and spiritual life. And here I speak of science for its own sake, and applied science. (Calder 1959, 5)

The words are Chaim Weizmann’s (the amphitheater was built beside his hilltop garden gravesite). On cool spring days, schoolchildren are herded to see the great man’s final resting place, and the words may be no less true for them than they were for Weizmann himself. As they snap shots of the grave on their iPhones, one may sense just how deeply science and technology have penetrated the material and spiritual lives of these young Israelis, as it had those of their parents and their parents’ parents.

NOTE

1. In the 1957–1958 academic year, for instance, the Hebrew University enrolled a total of 3,998 students of whom 812 studied science, 643 medicine, and 270 agriculture (Calder 1959, 11). In the same year, the Technion enrolled 2,300 students, all of whom (save several dozen architecture students) concentrated in pure and applied sciences (Calder 1959, 18).

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